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(54) **COLLAPSIBLE STEP PLATFORM AND RECEIVER POST**

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CPC **B60D 1/58** (2013.01); **B60D 1/243** (2013.01);
B60D 1/244 (2013.01); **B60R 3/00** (2013.01)

(58) **Field of Classification Search**
CPC B60D 1/243; B60D 1/244; B60D 1/60;
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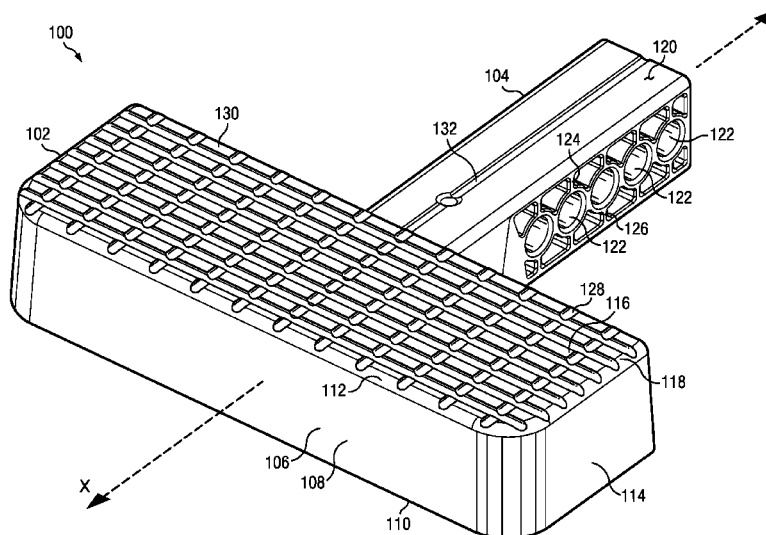
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(57) **ABSTRACT**

A collapsible step platform and receiver post are adapted to be attached to a vehicle hitch receiver. Oblique cross members of the step body provide additional protection in the event of a rear-end collision.

4 Claims, 2 Drawing Sheets



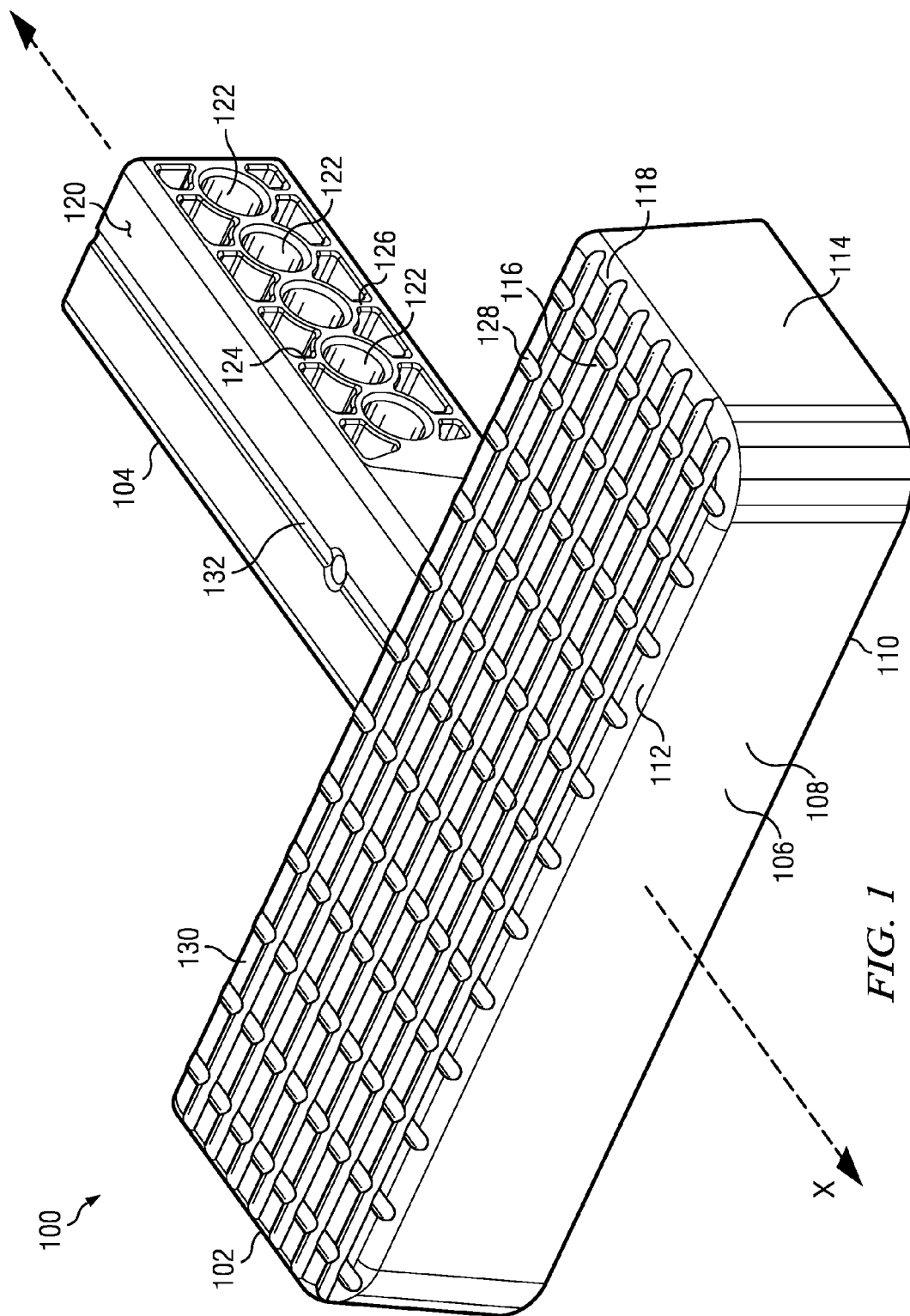
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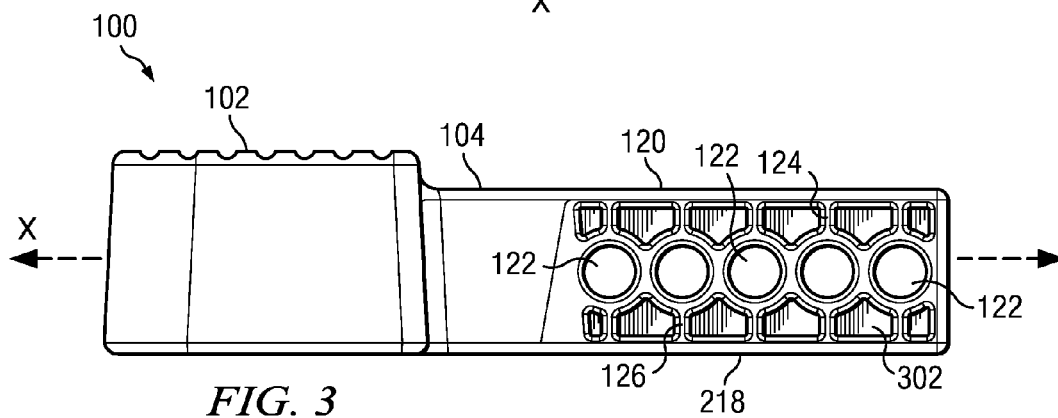
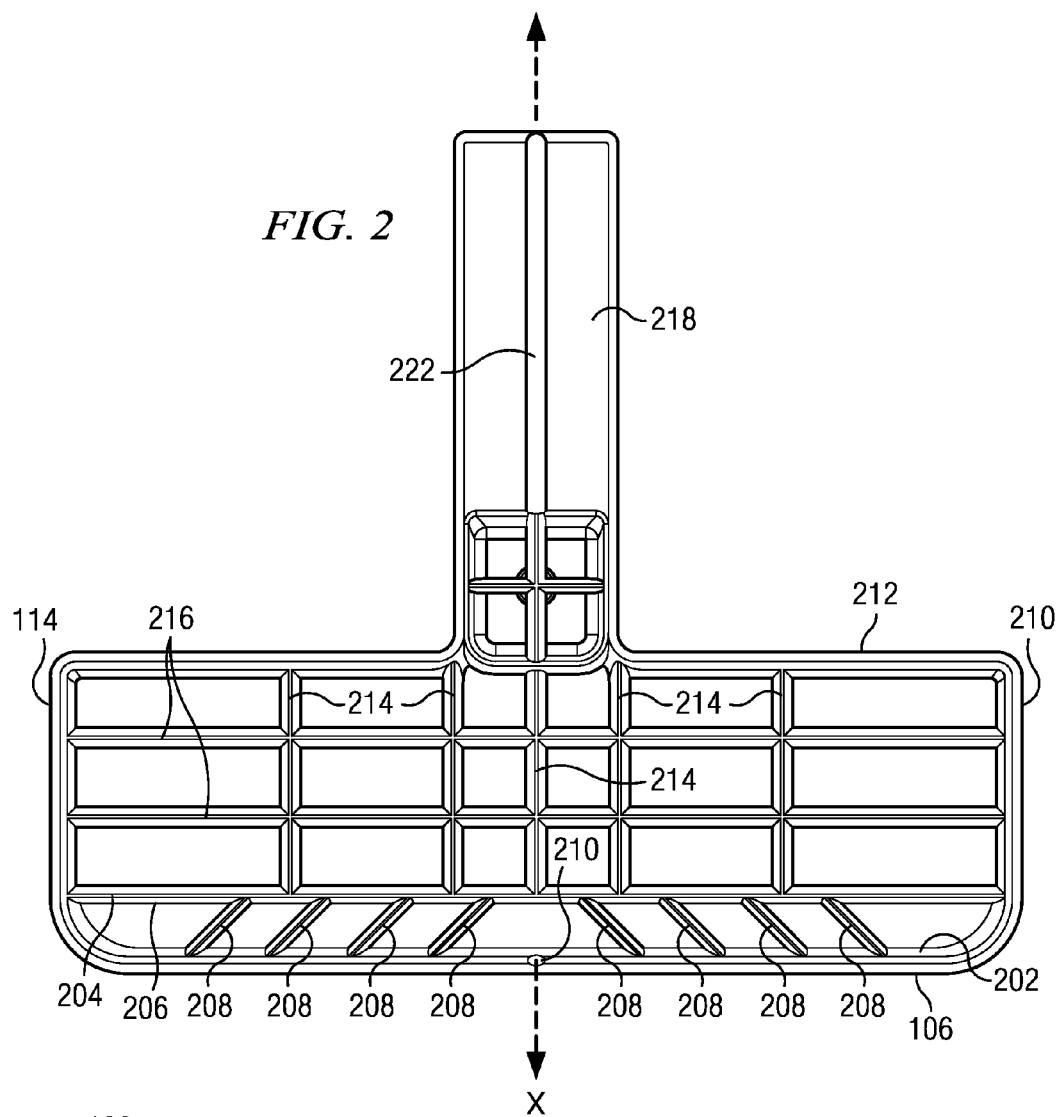
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**COLLAPSIBLE STEP PLATFORM AND
RECEIVER POST****BACKGROUND OF THE INVENTION**

Pickup trucks and sport utility vehicles (SUV's) [mini vans?] often have receiver-type hitches that mount to the frame of the vehicle. The receiver-type hitch has a rearward-facing opening that accepts ball mounts, bike racks, cargo carriers and other hitch mounted accessories. One accessory often attached to the hitch is a platform or step attachment. By providing a raised platform, the platform or step attachment makes the bed of the truck or SUV more accessible to the user. However, because the platform or step attachment extends rearwardly past the bumper, it will be the point of first impact for any rear end collisions.

Thus a need exists for a platform or step attachment for a receiver-type hitch that absorbs force from the impact of a rear end collision.

SUMMARY OF THE INVENTION

According to one aspect of the invention, a collapsible step platform is adapted to be attached to a vehicle hitch receiver. The step platform comprises a step body with a rear panel disposed substantially at a right angle to the longitudinal axis. The rear panel has an exterior side, an interior side, and a top and bottom edge. At least one transverse member is disposed forwardly of the rear panel and substantially at a right angle to the longitudinal axis. More than one oblique cross member extends from the interior side of the rear panel to a rear surface of the transverse member. Each of the oblique cross members is disposed at an angle which is between zero and ninety degrees exclusive from the longitudinal axis. The oblique cross members are adapted to collapse in a forward direction when the force of an impact is applied to the exterior of the rear panel.

According to another aspect of the invention a receiver post is adapted to be inserted into a hitch receiver. The receiver post has a receiver post body disposed around a longitudinal axis. The receiver post body has a top panel and a bottom panel spaced from and opposed to the top panel. A center panel extends from the bottom panel to the top panel and is substantially at a right angle to the top and bottom panels. More than one cylinder is disposed in the receiver post body and they are at an angle to the axis. Each of the cylinders extends through the center panel and has a support structure. The cylinder support structures each have a top vertical member in parallel with the cylinder and extending from the cylinder to the top panel and a bottom vertical member in parallel with the cylinder and extending from the cylinder to the bottom panel. The support structures are adapted to collapse upon impact, thereby absorbing the force from the impact.

The present invention provides an advantage to traditional hitch attachments in that the collapsible step platform and/or receiver post absorb at least some of the impact of rear end collisions.

BRIEF DESCRIPTION OF THE DRAWINGS

Further aspects of the invention and their advantages can be discerned in the following detailed description, in which like characters denote like parts and in which:

FIG. 1 is an isometric view of a collapsible step platform and receiver post according to the invention;

FIG. 2 is a side view of the collapsible step platform and receiver post; and

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FIG. 3 is a plan view of the bottom of the collapsible step platform and receiver post.

DETAILED DESCRIPTION

The present invention provides a collapsible step platform for insertion into a receiver type hitch on a vehicle. In the embodiment shown in FIG. 1, a step platform indicated generally at **100** includes a step body **102** and a receiver post **104**. The receiver post **104** is sized to fit inside a standard receiver-type hitch. The step platform is preferably formed from plastic as by injection molding but may also be formed from aluminum billet.

As shown in FIG. 1, the step body **102** has a rear panel **106** with an exterior surface **108**. The rear panel **106** is substantially perpendicular or at right angles to a longitudinal axis x. Rear panel **106** may be straight or may have a slightly convex curve such as a curve with a 400 inch radius. The rear panel **106** also has a bottom edge **110** and a top edge **112**. The step body **102** may have a right exterior side panel **114** which is substantially in parallel with the longitudinal axis and which joins the rear panel **106**.

The top of the step body may have a top panel **116** which may be joined to the rear panel **106** and the right exterior side panel **114**. The top panel **116** may have an exterior side **118**. A series of longitudinal indentations **128** and lateral indentations **130** may be formed on the exterior side **118** of the top panel **116**. The longitudinal and lateral indentations **128**, **130** provide traction to the user when using the step, however, the number and placement of the indentations can vary. Additionally, the step body may be attached to a receiver post **104** which will be discussed in further detail below.

As seen on the embodiment illustrated in FIG. 2, the rear panel **106** has an interior side **202** and may join a left exterior side panel **210**. The left exterior side panel **210** is substantially in parallel with the longitudinal axis x and is transversely spaced from the right exterior side panel **114**. The left exterior side panel **210** may join the top panel **116**. At least one transverse member **204** is disposed forwardly of the rear panel **106** and at a right angle to the longitudinal axis x. The transverse member **204** may take the form of a plate or panel has a rear surface **206**. Member **204** may extend between and be joined to the right side panel **114**, the left side panel **210**, and the top panel **116**.

Some embodiments may include additional transverse members **216** such as the two additional transverse members **216** shown in FIG. 2. The additional transverse members **216** are disposed substantially at right angles to the longitudinal axis x and are forwardly spaced from the first transverse member **204** and spaced from each other. The additional transverse members **216** extend between the right side panel **114** and the left side panel **210**. Longitudinally aligned support members **214** may be panels or plates, and may extend from the transverse members to the forward panel **212**. The longitudinally aligned support members **214** are spaced from each other and are at substantially right angles to the transverse members **204**, **216**, however the number of additional transverse members **216** and spacing of the additional transverse members **216** may vary from what is shown in the illustrated embodiment of FIG. 2.

More than one oblique cross member **208** extends from the interior side **202** of the rear panel **106** to the rear surface **206** of the transverse member **204**. In the illustrated embodiment eight oblique cross members **208** are shown, but the number may include more or less. Each of the oblique cross members **208** is disposed at an angle between zero and ninety degrees exclusive from the longitudinal axis x; in the illustrated

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embodiment the angle is approximately forty-five degrees. Additionally, in the illustrated embodiment half of the oblique cross members **208** are on either side of the midpoint **220** of the rear panel **106**. The oblique cross members **208** are adapted to collapse in a forward direction upon impact being applied to the exterior surface **108** of the rear panel **106**. Therefore, in the event of a rear end collision, the collapsing oblique cross members **208** will absorb at least some of the force of the impact. Cross members **208** may have a thickness which is several times less than their length and may take the form of panels or plates, as shown.

As shown in FIG. 1, the collapsible step platform **100** may include a receiver post **104**. The receiver post body **104** is disposed around longitudinal axis **x**, and has a top panel **120** and a bottom panel **218** (See FIG. 2) opposed to and spaced from the top panel **120**. The top panel **120** and the bottom panel **218** are substantially parallel with the axis **x**. In addition a center panel **302** (See FIG. 3) may be vertical and is also parallel to the axis **x**. The center panel **302** may be lined up along the receiver post top panel indentation **132** and receiver post bottom panel indentation **222** (See FIG. 2).

A plurality of cylinders **122** are disposed in the receiver post body **104** at an angle to the axis **x**, such as 90 degrees. One of the cylinders **122** will receive a pin from the receiver-type hitch, thereby attaching the receiver post **104** (and in this case the collapsible step platform **102**) to the hitch. Accordingly, the number and placement of cylinders **122** may vary due to the type of receiver-type hitch being used and application. Each of the cylinders **122** extends through the center panel **302** (see FIG. 3) which may be aligned on the longitudinal indentation **128** shown on FIGS. 1 and 2. Each cylinder **122** has a support structure which includes a top vertical member **124** in parallel with the cylinder **122** and extending from the cylinder **122** to the top panel **120** and a bottom vertical member **126** in parallel with the cylinder **122** and extending from the cylinder **122** to the bottom vertical member **218**. Vertical members **124**, **126** may have thicknesses which are many times smaller than their lengths and may be plates or panels, as shown. Support structures **124**, **126** support cylinders **122** but provide no resistance to a rear axially applied impact force; all of the impact force has to be absorbed by cylinders **122**, top panel **120**, bottom panel **218**

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and central panel **302**. A step body **102** may be integrally formed with and extend rearwardly from the receiver post.

In summary, a collapsible step platform and receiver post have been shown and described which absorb force from a rear-end collision. While illustrated embodiments of the present invention have been described and illustrated in the appended drawings, the present invention is not limited thereto but only by the scope and spirit of the appended claims.

I claim:

1. A receiver post to be inserted into a hitch receiver, the receiver post comprising:

a receiver post body having a top panel, the receiver post body disposed around a longitudinal axis, a bottom panel spaced from and opposed to the top panel, the top panel and the bottom panel being substantially parallel with the axis, a center panel extending from the bottom panel to the top panel and substantially at a right angle to the top and bottom panels;

a plurality of cylinders disposed in the receiver post body to be at an angle to the axis, each of the plurality of cylinders extending through the center panel, a respective support structure provided for each of the plurality of cylinders, each of said support structures including a top vertical member in parallel with the cylinder and extending from the cylinder to the top panel and a bottom vertical member in parallel with the cylinder and extending from the cylinder to the bottom panel, each of said support structures being spaced apart from adjacent support structures, the support structures adapted, upon impact being applied to the receiver post, to collapse, thereby absorbing the force from the impact.

2. The receiver post of claim 1, wherein the top and bottom vertical members are plates which are substantially perpendicular to the longitudinal axis and the center panel.

3. The receiver post of claim 1, further including a step body integrally formed with and extending rearwardly from the receiver post.

4. The receiver post of claim 1, wherein the receiver post is integrally molded of a polymeric material.

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